Turbulent heating and nonthermal broadening in solar flares

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Synchronous *Yohkoh* observations of soft X-ray nonthermal line broadening and hard X-ray emission in solar flares suggest that both the nonthermal broadening and the plasma heating are due to plasma turbulence created in the energy release. We develop the model of a flaring loop energized by the turbulence of kinetic Alfvén waves (KAWs) excited by reconnection outflow.

Spectral dynamics and mechanisms for the interruption of spectral energy fluxes in the KAW turbulence are investigated. These processes determine the nonthermal broadening in flares and are important for the selective heating of plasma species and for the acceleration of particles to high energies. Depending on the gas/magnetic pressure ratio, the ion Landau damping or induced ion scattering of KAWs comes into play, and the turbulence dissipation gives rise to a preferable heating of ions or electrons.

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